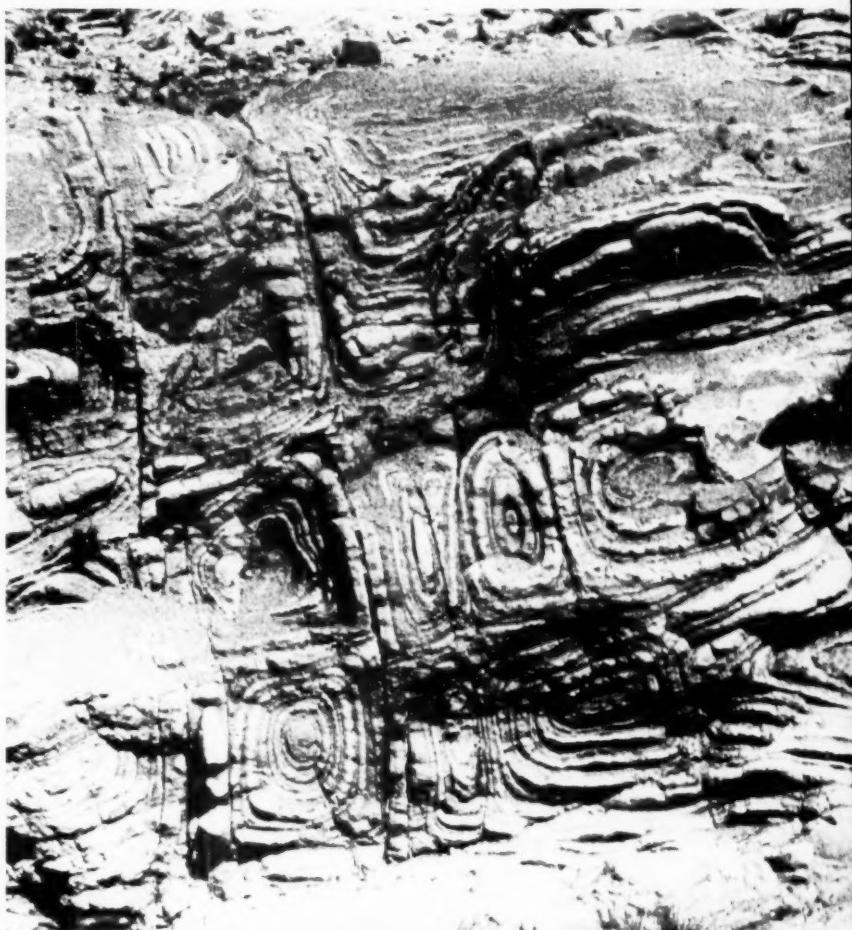


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Successor to the Geological Newsletter



November 1956

Volume 1, No. 5

Published Monthly by the
American Geological Institute

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Calendar

Cooperation of Society Secretaries in supplying meeting notices for GEOTIMES calendar is requested.

- Nov. 8-9, 1956—A.A.P.G., S.E.Gp., & S.E.P.M., Pacific Section, Ambassador Hotel, Los Angeles, Calif.
- Nov. 8-10, 1956 — A.I.M.E., N.E. REGIONAL MEETING, Mining Branch, Hotel Hershey, Hershey, Pa.
- Nov. 12-15, 1956—A.P.I., 36th Ann. Mtg., Chicago
- Nov. 12-16, 1956—SOIL SCIENCE OF AMERICA, Cincinnati, Ohio.
- Nov. 26-30, 1956—SECOND NORELCO ELECTRON MICROSCOPE SCHOOL, at the offices of the Instruments Division, North Amer. Philips Co., Inc., 750 S. Fulton Ave., Mt. Vernon, N.Y. Attendance by invitation only, but those interested should write C. J. Woods indicating their desire to attend. No registration fee.
- Dec. 3-4, 1956—SECOND ROCK PRODUCTS CONFERENCE sponsored by Univ. Extension, Kans. Ls. Assoc. & the Geol. Surv. of Kans. for Kansas limestone producers. Univ. of Kans., Lawrence.
- Dec. 10-12, 1956—AMERICAN NUCLEAR SOCIETY, Sheraton-Park Hotel, Washington, D. C.
- Dec. 26-29, 1956—A.A.S., Hotel New Yorker, New York City.
- Jan. 14-16, 1957—COUNCIL OF ENGINEERING SOCIETIES, annual meeting, Statler Hotel, New York City.
- Jan. 14-26, 1957—WORLD METEOROLOGICAL ORGANIZATION, 2nd Session of the Commission for Climatology, Washington, D. C.
- Jan. 17-18, 1957—ENGINEERS JOINT COUNCIL, third General Assembly, Statler Hotel, New York City.
- Feb. 24-28, 1957—A.I.M.E., Annual Meeting, Hotels Roosevelt and Jung, New Orleans, La.
- Mar. 4-8, 1957—PITTSBURGH CONF. ON ANALYTICAL Chemistry and Applied Spectroscopy, Pittsburgh, Pa.
- Mar. 10-16, 1957—SECOND NUCLEAR ENGINEERING & SCIENCE CONGRESS, sponsored by EJC, AGI participating. Convention Hall, Phila., Pa.
- April 1-4, 1957—A.A.P.G., National Convention, Kiel Auditorium, St. Louis, Mo.
- April 5, 6, 1957—PACIFIC SOUTHWEST MINERAL INDUSTRY CONF., sponsored by Nevada, San Francisco & So. Cal. Secs. of A.I.M.E., Reno, Nev.
- April 29-May 1, 1957—AMERICAN GEOPHYSICAL UNION, 38th Annual Meeting, Washington, D. C.
- May 7, 1957 — INTERNATIONAL HYDROGRAPHIC CONF., Seventh Congress, Philadelphia, Pa.
- May 16-18, 1957 — G.S.A., SOUTHEASTERN SECTION, Morgantown, W. Va.
- 1957-58 — INTERNATIONAL GEOPHYSICAL YR.
- July 10-19 — INTERNATIONAL UNION OF CRYSTALLOGRAPHY, 4th General Assembly & International Congress. McGill Univ., Montreal, Quebec.
- August, 1957—INTERNAT. ASSOC. OF SEISMOLOGY & Physics of the Earth's Interior, Toronto, Ont.
- August, 1957—INTERNATIONAL ASSOC. OF PHYSICAL OCEANOGRAPHY, General Assembly, Canada.
- 1960—XXIst INTERNATIONAL GEOLOGICAL CONGRESS, Copenhagen, Denmark. Field excursions to Scandinavian countries.

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Robert C. Stephenson,
EDITOR

Kathryn Lohman
CIRCULATION MANAGER

Vol. 1, No. 5

November 1956

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GEOTIMES is published monthly by the American Geological Institute at Williams & Heintz Lithograph Corporation, Washington, D. C. Editorial, Circulation and Advertising Offices are at 1519 Massachusetts Ave., N.W. Address all correspondence to 2101 Constitution Ave., N.W., Washington 25, D. C.

Subscriptions: Distributed to members of member societies as a part of their societies' membership. Non-member, U.S.A. and Possessions, Canada and Mexico, \$2.00 per year; elsewhere, \$2.50 per year.

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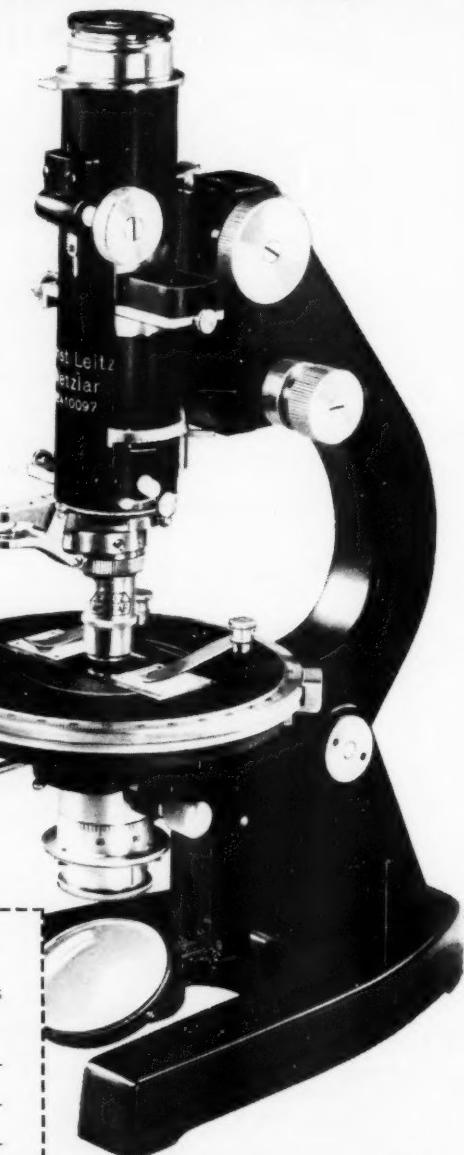
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A Unifying Force

On October 12, leading scientists from many parts of the country gathered in Washington on the occasion of the dedication of the new headquarters building of the American Association for the Advancement of Science. We are proud that this building now is also the home of the American Geophysical Union and the American Geological Institute.

In the 108 years of the Association's existence science has undergone many changes. Specialization of and within the various scientific disciplines has become the rule. The AAAS has stood stoutly as a bulwark against this trend. Through its program, its meetings and its journals, the Association has provided interdisciplinary communication essential to counteract fragmentation of the sciences.

There was studied significance in the theme selected for an outstanding group of talks at the dedication ceremonies. It was "The Uses and Effects of Atomic Radiation." Problems relating to the scientific, technical and social aspects of development, utilization and control of atomic energy have focused sharply on the need for the fully coordinated cooperation of the entire scientific and engineering communities. The earth scientists, biologists, physical scientists and engineers each have their area of contribution in the atomic era. It is the responsibility of each group to rise to meet the problems that lie within the province of its particular proficiencies and to recognize with equal clarity the areas in which it must defer to others.

The American Association for the Advancement of Science, which has stood as a welding force against the fragmentation of the sciences, finds a new place in the sun as the present day needs for scientific unity are forcefully underscored. The newly dedicated building is symbolic of the recognition of this scientific unity, both to the scientists and the public.



OUR COVER

Photograph of unique orbicular weathering of granite near Huaras, Northern Peru. See page 18. Photo by courtesy of G. C. Amstutz.

The AMERICAN GEOLOGICAL INSTITUTE is a non-profit professional service organization established and managed by the scientific societies in the fields of geology and geo-physics in cooperation with the National Academy of Sciences-National Research Council. It is the instrument of the profession serving and advancing the welfare of the geoscientist in matters relating to education, professional responsibilities and government relations. It is an active member of the Scientific Manpower Commission. It also functions in the stimulation of public education and awareness of the earth sciences, through career literature, the scouting program and other channels of communication.

GEO TIMES is the news magazine of the geological sciences. It reports on current events in the earth sciences, public education and public relations efforts throughout the profession, as well as appropriate legislative and governmental issues. It announces scholarships, fellowships, publications and new developments. It provides a forum for discussion of timely professional problems, and affords a common bond between the many specialized groups within the earth sciences.

RESPONSIBILITIES OF INDUSTRY IN TECHNICAL MANPOWER DEVELOPMENT

by

D. A. McGEE, *President*
Kerr McGee Oil Industries Inc.

ROBERT MACVICAR, *Executive Director*
Frontiers of Science Foundation
of Oklahoma, Inc.

During the recent past, there has been a great deal said and written about the current shortage of technical manpower in this country, a shortage which unquestionably hampers our orderly economic development and threatens our national security. Geoscientists of all classifications are needed in increasing numbers to staff the growing organizations of modern industry and to provide technical support to an increasing breadth of activity in which their competencies are needed. There is every reason to believe that a larger and larger number will be needed in all phases of the mineral industries. Higher and higher levels of training will be required to provide the skills necessary to find, for example, the oil and gas accumulations of the future. The producing and processing phases of the mineral industries are also demanding more and more scientists, engineers and highly trained technicians as lower grade materials must be transformed into products held to more and more rigid specifications.

Anyone who attempts to analyze the causes of this shortage must be careful to avoid over-simplification. The problem has extremely complex origins and does not readily yield to dissection. Among the most obvious causes, however, are those that originate in the educational system, those that originate in the public mind, and those originating within industry itself.

We do not consider ourselves competent to comment extensively upon the educational aspects of the problem, but it is apparent to even the casual observer that there are grave deficiencies in our educational system which contribute to a dearth of scientists and engineers. A decreasing percentage of the youth are being given an opportunity to come in contact with stimulating science and mathematics teachers. The shortage of scientists and engineers looks like a surplus when compared with the almost negligible supply of high school teachers of physics, chemistry, and mathematics. In Oklahoma, and in general throughout the nation, only a bare trickle of replacements are available to staff the high school teaching posts. As a result, teachers are becoming both older and less well prepared.

If both the numbers and the quality of the high school teachers of science and mathematics are to be improved, industry

must carry its full share of seeing to it that corrective action is instituted. It cannot do this by "loaning" a few of its scientific staff to the schools for a few hours a week. Rather it must join with other interested groups to see that both the economic rewards for and prestige values of high school science and mathematics teachers are restored to a level capable of attracting and retaining competent young men and women in the profession. Industry must recognize its responsibility not only to society but to its own self-preservation by emphasizing the need for a quality program of public education. Industrial leadership must assume the responsibility of providing summer employment opportunities for teachers commensurate with their abilities and a proper status for the profession. Industrial leaders, better than any others, can challenge the common practice of uniform "salary schedules" for teachers based upon academic degrees and tenure rather than upon

the cold, hard facts of a competitive economy. The many splendid educational publications and films currently being released by many firms should be continued and even greater emphasis placed on the scientific and technological aspects of modern industry. There is no substitute for a good teacher, however, and until they are back in the classrooms teaching science and mathematics we may expect that a qualitative shortage, if not a quantitative shortage, of technically trained people will continue.

To a lesser degree, the serious problems of a declining quality of instruction are encroaching upon the colleges and universities. If the needs of the future are to be met, industry, to an increasing degree, must willingly provide the funds to assure an adequate program. Support of research and development in the universities is an important way of maintaining the quality of instruction by permitting the retention of staff who would otherwise leave for positions providing both higher salaries and greater opportunity for research. In addition, such funds can often be used to support students, particularly graduate students, thus increasing the number of more highly trained people.

Respect for Scientist Vital

A major factor influencing career selection by young people is the public attitude toward the profession. Despite the almost overwhelming dependence of our society upon science and technology, it is an unhappy fact that the public generally neither fully recognizes nor appreciates the contributions of the scientist and technologist to their welfare. In the words of Dr. I. I. Rabi, Nobel Prize-winning physicist, "As the importance of science increases, its dignity seems to be diminishing." The scientists and engineers are really the "heros" of our modern society, not the "villains" or the "clowns" that they are often made to appear to be by the mass communications media. The attitude survey recently conducted by Purdue University reveals an appalling lack of understanding of what a professional career in science or technology is like and what kind of abilities are necessary for success in these fields.

Here industry has powerful means at its disposal to improve public understanding and appreciation of science and technology. Most industries now publish magazines for their employees through which information could be channeled effectively. Many opportunities are also available through advertising media to place accurate information on science before the

public. Such activities as the television series sponsored by the National Association of Manufacturers need expansion.

Industry Policy Needs Reform

Policies and practices within industry itself have, to some degree at least, contributed to the shortage of technical personnel. The economic status of the scientific and engineering profession has not always been as favorable as is currently the case. In some industries, moreover, the scientific programs have been looked upon by management as one of the first phases of the over-all operation to suffer cut-backs during slack periods rather than one of the last. Not infrequently, improper utilization of the professional skills of highly trained people has resulted in frustration. Personnel management of scientists and engineers is more complex than that of non-professional people, and this fact has not always been recognized by management. All of these factors have led to the development of unfavorable attitudes and the fact that only a small segment of industry is guilty of any of them does not mean that a vigorous effort should not be made to develop programs for the most effective use of the scientist and engineer.

Frontiers of Science Foundation

An encouraging thing in the present situation is that industry recognizes the situation and is desirous of being of assistance. One of the difficulties for small and medium sized industry is that, by and large, they have no effective means of making a contribution to the solution of so complex a problem. To provide such a means, Oklahoma's business and industrial leaders have pooled their resources and formed a small, tax-exempt, educational foundation, The Frontiers of Science Foundation. Individual contributions are relatively small, but have provided a sufficient sum to institute a program primarily of an informational and educational character. Although less than a year old in terms of its program, the Foundation has already had a substantial impact on the attitude of the people of the state toward science and technology.

In its effort to improve public understanding of science, the Foundation joined with other groups and brought the U. S. portion of the Geneva "Atoms for Peace" exhibit to the state. Over 300,000 persons, including over 100,000 school children saw the exhibit. The National Science Fair

was held in Oklahoma City with the Foundation acting as principal sponsor. The National Aircraft Show was held here in early September as another civic effort to improve public understanding of science and technology. Public forums and lectures are sponsored by the Foundation, material on science and technology is prepared for release to press, radio, and television, and appropriate material is constantly being sent out to a growing mailing list of Oklahoma's leadership group in government, education, business, and industry. Outstanding scientists have been brought to the state for public appearances and more are scheduled for the coming year. Splendid cooperation has been extended to the Foundation by all the mass communication media.

In the field of education, the Foundation's major emphasis has been on stimulating concern about science and mathematics teaching on the part of educators and teachers, pupils and their parents, appropriate professional groups, and the public generally. In collaboration with Science Research Associates and with the stimulus and support of the Foundation, the Oklahoma Curriculum Improvement Commission sponsored a state-wide testing program in the spring of 1956. The first state-wide effort of its type, over 60,000 high school students (over half of the high school students in the State) were tested by an extensive battery of tests. The students ranking in the upper 20% in the science and mathematics portion of the test received letters of commendation and challenge from the Foundation. A follow-up program has been instituted to determine what has happened to the top 2% of this group. Continuing contact is maintained with the over 700 high school districts of the State, providing counseling material, pamphlets, and booklets of a scientific nature and other sources of information.

A "grass-roots" program of this type provides an effective way in which interested persons and firms can get together to effectively deal with the problems of the quality of the educational opportunity being afforded our young people, particularly with regard to science and mathematics instruction. The duplication of such an effort throughout the nation would have an impact upon the situation which could be effected only by the massive intervention of the Federal Government. It is the hope of many of Oklahoma's business and industrial leaders that the Frontiers of Science Foundation will be a prototype of similar efforts throughout the nation.

MANPOWER in a column —

By HOWARD A. MEYERHOFF
Scientific Manpower Commission

Geologists and many geophysicists in the employment of the Federal Government find themselves today in a regrettable position as a result of recent Civil Service Commission actions aimed at alleviating shortages of scientists and engineers in government.

Under provisions of Public Law 763, the Commission has been authorized to raise salaries in those disciplines where the affected government agencies have found it extremely difficult to recruit necessary scientists and engineers. In most cases the salary increases have been granted only at the starting GS 5 & GS 7 levels. Recently, however, the Civil Service Commission granted major increases throughout the grade scale for certain research scientists in the field of aeronautics. Benefiting from PL 763 over the past year and a half are most engineers, chemists, physicists and other physical science groups. The foresters have just received increases in the entering grades. Indeed it appears that earth scientists are about the only remaining major science groups still paid at the scale adopted in March 1955.

Geological scientists in government agencies such as the U.S.G.S., C. of E., S.C.S. and others are working along side hydraulic engineers, soil scientists, chemists, physicists, and mathematicians who have benefited from increases effected through the application of PL 763. It is galling—to say the least—to see individuals of comparable training and experience receiving a rate of pay several hundred dollars higher. The morale of these organizations can suffer seriously from such inequities. In administering the law the Civil Service Commission has insisted on strict adherence to the major premise, namely that salary increases be granted only where proof of unfilled jobs could be clearly established.

It is known that the U. S. Geological Survey is concerned with the adverse effects to date on the earth scientists through the administration of PL 763. However, the Survey is reportedly looking at the problem with the broader objective of securing a salary scale commensurate with training, talent and responsibilities that will enable them to retain key personnel throughout the organization. Toward this end they are making a detailed analysis of salaries among all earth scientists.

SOUTH DAKOTA TECH

Students Attend Congress

Eleven junior and senior geology majors from the South Dakota School of Mines and Technology made a two and one-half week field trip to Mexico for the XXth International Geological Congress under the leadership of Dr. J. R. Macdonald, Associate Professor of Geology. The group travelled south of the border in a caravan of five automobiles, camping out when weather permitted.

The group studied the prominent geographic features along the route of their trip—the Pine Ridge escarpment in Nebraska, the Goshen Hole Basin in Eastern Wyoming and the Front Range of the Colorado Rockies including Pikes Peak.

New Mexico provided the students an opportunity to see the Sangre de Cristo Mountains near Taos, and the playa lake beds in the flat lands near Encino. At Carrizozo, New Mexico, there was a lecture on the lower Sonoran Basin, and further south, the Sacramento Mountains and White Sands National Monument.

Crossing the Mexican border at El Paso-Ciudad Juarez, Tech students stopped only long enough to obtain automobile insurance, visitor permits, and to exchange American dollars for Mexican pesos. During the entire trip, the students paid their own expenses, which included registration fees at the International Congress, transportation, lodging and meals. Parral, Chihuahua, was the first over-night stop after leaving the border.

When the Tech students visited the Fresnillo Mine in Zacatecas, the company was celebrating the 402nd anniversary of the opening of the mine. The students were fortunate to have a personally conducted tour of the operation by the General Manager, J. R. Stone. The mine, largest in Mexico, has some 300 miles of underground workings, and over 3000 people are employed at the operation.

The travelling geology students arrived in Mexico City on the night of September 3 and registered Tuesday morning in time to attend the impressive inaugural ceremonies at the National Auditorium when President Adolfo Ruiz Cortines spoke. They attended as many technical sessions



¿Cuál es el precio de esto?—Demasiado!



High-grading on ore dump at Fresnillo, Zacatecas.



Tech geology students about to enter the National Auditorium for the inaugural ceremonies. Left to right are Carter Billups, Mike Connor, Lauren Steege, Tom Robertson, Lloyd Potter, Tom Albert, Al Kelly, and David Sturgeon, all senior geological engineering students at South Dakota Tech.

as possible, trying their language proficiencies by sitting in on papers in Spanish, French and German. It is reported that the boys all heard one paper—that presented by their own Prof. — "Pliocene Mammalian Faunas of Nevada, U.S.A.," (by J. R. Macdonald).

It was not all science and technology for the boys from South Dakota School of Mines. They took in all of the special entertainment functions of the Congress—the folk dances, la Charreada (rodeo and horse show, Mexican style), ballet, etc. They also found time for geologic and sightseeing trips in the vicinity of Mexico City. Of course, they can recount their experiences of a Sunday afternoon at the bullfights—Mexico City's arena is the largest in the world. The fellows also

continued on page 16

France Must Have Oil

France must import some 25 million tons of crude oil a year to feed its productive modern refineries, fuel its transport, lubricate its hard-pounding industry, and support its up-bounding living standard. For although oil production in France and the French Union has more than doubled in the past three years, it still amounts to little more than a million tons a year, and the known oil resources in France are estimated at no more than 30 million tons.

Americans astonished at the extent of French anxiety over the Suez crisis perhaps do not sufficiently realize that the whole fabric of the French economy and the nation's well-being and future, as well as its strength as a bastion in the Atlantic Alliance, are now heavily dependent on assured and continuing supplies of oil from the Middle East. The fact is, France now imports some 23 million tons of crude oil a year from the Middle East, about 90 percent of its total annual consumption.

Even if production in North and South America could replace the oil France now gets from its Middle Eastern sources, the cost in dollars would be a serious drain on the nation's economy.

In this situation, and in the certainty that the rapidly expanding French economy will need more oil each year, the nation's political and industrial leaders feel duty-bound to secure and expand the country's sources of supply.

Imports

In 1955, French imports from the Middle East amounted to more than 9 million tons of crude oil from Iraq, over 7 million tons from Kuwait, about 3 million tons from Arabia, over one million tons each from Qatar and Bassorah, about a million tons from Iran, and a smaller tonnage from Wafra. The remainder of French oil imports — 1,480,000 tons — came from South America and other sources.

Barring local political or military upheavals, French Middle East supplies at source are virtually assured by the *Compagnie Francaise des Petroles'* 23.75 percent participation in production of the Iraq Petroleum Company, and by its position in the International Consortium of Iranian Petroleum.

The French share in the production of the Iraq Petroleum Company and its affiliated companies has gone up from 7,220,000 tons in 1949 to 10,500,000 in 1955.

Reprinted from *FRANCE ACTUELLE*, vol. 5, no. 17, published by the Comité France Actuelle, Paris, France.

The increased outflow from the Iraqi enterprise is due largely to the construction of huge pipelines which now carry 23 million tons of crude oil annually from Kirkuk to the Mediterranean. Furthermore, there has been a considerable development of the Qatar and Bassorah sources.

Oil Production

The spurt of oil production inside France since 1954 is attributable primarily to the *Esso Standard S.A.F.* discovery at Parentis, near Bordeaux. By the beginning of this year, 12 wells were working in the Parentis field and turning out an exceptionally good-quality crude (one-third gasoline by simple distillation) at the rate of almost a million tons a year. A new strike, possibly an important one, recently has been made at Mothes, eight miles from Parentis.

The field at Lacq (Basses-Pyrenees) discovered in 1949 by the *Societe Nationale des Petroles d'Aquitaine (S.N.P.A.)* is 2,135 feet deep and has a score of productive wells pumping out 250,000 tons a year of a petroleum which unfortunately is heavy, sulfurous, and hard to refine.

At Staffelfelden (Haut-Rhin) the *Societe de Prospection et Exploitation Petrolières en Alsace (P.R.E.P.A.)* has been extracting 15,000 tons annually of excellent quality oil since 1951.

At Sidi-Aïssa (Algeria) a field was discovered in 1949 by the *Societe Nationale des Recherches de Petrole en Algerie (S.N. REPAL)*, and last year its 45 wells produced 60,000 tons of excellent light oil.

At Oued Beth (Morocco) wells de-

veloped between 1948 and 1954 by the *Compagnie Cherifienne des Petroles* last year altogether yielded 100,000 tons of heavy petroleum.

Gas Production

Production of natural gas in France has increased from 360 million cubic feet in 1946 to 918 million cubic feet this year.

Toward the end of 1951, gas was discovered 12,000 feet beneath the petroleum well at Lacq. Its reserves are estimated at more than 180 billion cubic feet. Annual production from this source is estimated at 71,000 tons of gas, 8,000 tons of propane and butane, and 55,000 tons of sulfur.

This gas will be most important to the southwest area of the country which heretofore lacked a source of natural energy. And the sulfur will help the nation's trading position, as France must now import most of the 120,000 tons consumed annually.

The National Need

Consumption of petroleum products in France last year totaled 17.5 million tons, three times the prewar amount and an 11.3 percent rise over the 1954 demand.

Fuel in various forms accounts for well over half the country's consumption of petroleum products, as compared to 35 percent for this purpose in 1938.

The amazing increase of automobile, motorcycle, motorscooter and motorbike ownership and operation in France in recent years has enormously expanded the market for gasoline. From 1954 to 1955 alone, sales went up 12.1 percent to a record 4,229,571 tons. Demand would be considerably greater if it were not for the high state tax on gasoline. That tax now comes to about 60 cents a gallon—65 percent of the selling price and more than three-and-a-half times the value of the gasoline when it leaves the refinery. (In view of the exceedingly high cost of gasoline, foreign tourists are non-plussed at the traffic jams in Paris and the number of motor vehicles on French highways.)

The increased agricultural demand for oil and gas is indicated by the fact that there are now about 350,000 tractors in use on the nation's farms, compared to 30,000 in 1938.

France continues to import aviation gasoline. However, consumption of French-made jet fuel has quadrupled since 1951, and the modern French air fleet today

uses more of this product than aviation gas.

The usage of heavy fuel for the transport industry has increased more than ten times over the prewar demand to a 1955 consumption of 1.5 million tons.

Factories and industry generally used about 5 million tons of heavy fuel oil last year. Over 3 million tons of light fuel oil in 1955 went into heating and similar uses in the country. Just under a half million tons of oil last year were used as lubricants.

Liquified gases (butane and propane) have gained more importance, and demand for them rises at the rate of about 20 percent a year.

Search for New Supplies

To help meet its present and future needs for oil, as well as to reduce its dependency on Middle East sources and delivery routes, France is making a considerable oil exploration effort.

This year private and public investment in the search for oil in France and the French Union will reach the franc equivalent of about \$115 million. Some 9,000 men are engaged in this widespread and intensive search.

In metropolitan France the major areas being explored are the Parisian Basin, Alsace, the Aquitaine Basin, the Rhone Valley and the Mediterranean Midi.

In the overseas French Union, units are studying external evidence and digging test wells in Algeria, Morocco, Tunisia, French East Africa, French West Africa, Madagascar and the Cameroons. A major search is even being made for oil under the sands of the In-Salah and Fort Flatters regions of the Sahara Desert.

France needs oil and lots of it to live and grow as a strong and modern nation, and the country is determined to do whatever is necessary and feasible to secure its present sources of supply and develop new ones.

Venezuelan Geophysical Association

Fifty-one members of the Society of Exploration Geophysicists in Venezuela have joined to organize the Asociacion Venezolana Geofisica which is expected to become a local section of SEGp. C. G. Schauble is acting secretary of the new association and Joseph A. Keeling is program chairman.

Three other local sections of SEGp are being organized at Edmonton, Alberta, Regina, Saskatchewan and Salt Lake City, Utah.

GEOLOGY



*in the
Public Eye*

by
Bob
Bates

To help combat the expected shortage of future scientists, Florida State University each summer runs a 2-week Science Camp for 80 to 100 superior high-school students. Headquarters are at the University in Tallahassee. Practically all the sciences are represented. The geology part includes laboratory work with minerals, rocks, fossils, and maps, as well as a field trip to collect fossils from the Tampa limestone and to visit the Marianna Caverns. The students are eager to learn and their reactions are enthusiastic; most who go to college continue their interest in science. Steve Winters, who has been in charge of the geology program and will be director of the camp next year, will be glad to correspond with others interested in operating such a program. (The one at Kansas was briefly mentioned here last month.)

Dr. Richmond E. Myers of Moravian College, Bethlehem, Pa., writes a thrice-weekly column for a local paper, circulation 27,000. Most of his columns are on some phase of local geology. Examples include trap rock and the importance of Little Round Top and other trap ridges in the Battle of Gettysburg; ancient rocks of the Lehigh Hills; effects of glaciers on eastern Pennsylvania; underground waters; and the famous potholes in the channel of the Susquehanna River. Dick reports that mail and phone calls have indicated widespread interest in the geology of the region.—How about convincing your local editor that you should contribute such a series?

The Traveling High-School Science Library, described here in September, has been enlarged from 150 to 200 books; and the number of works on geology has been doubled. But don't get excited. This just means that the titles in our favorite science have gone from 4 to 8, or from 2.7 to 4.0 percent of all the books included. The newly added books are Mohr and Sloane on *Celebrated American Caves*; Kuennen, *Realms of Water*; and the Fentons, *Life Long Ago* and *The Rock Book*. These are all fine, but we need more. Must the little lads and lasses conclude from their library that geology is merely a 4-percent science?

AAPG Research Grants

The American Association of Petroleum Geologists announces the award of grants-in-aid of research to the following:

Edwin W. Biederman, Jr., of the Pennsylvania State University; \$305.00 in support of a study of shore-line sedimentation (beach, dune, lagoon and marsh) on the New Jersey coast.

John A. Campbell, University of Colorado; \$400.00 in support of a petrologic study of the Lykins Formation in the Colorado Front Range.

Alan C. Donaldson, Pennsylvania State University; \$400.00 in support of a stratigraphic, petrologic, and paleontologic study of the Stonehenge Formation of central Pennsylvania.

Robert L. Ellison, Pennsylvania State University; \$328.00 in support of a paleontologic study of the Hamilton Group of central and south-central Pennsylvania.

John P. Hobson, Jr., Pennsylvania State University; \$500.00 in support of a lithostratigraphic study of the Beekmantown Group of southeastern Pennsylvania.

John Imble, Columbia University; \$750.00 in support of facies studies in the Florena Shale of Nebraska, Kansas, and Oklahoma.

Satyabrata Ray, Lehigh University; \$1,000.00 in support of a geochemical and mineralogical study of the Jacksonburg Limestone of eastern Pennsylvania.

Samuel I. Root, Ohio State University; \$200.00 in support of a petrologic study of the rocks of the Cuyahoga and Logan Formations of Knox County, Ohio.

Edward Sturm, Rutgers University; \$385.00 in support of a mineralogic and petrologic study of the Newark Series.

Alan Frank Thomson, Rutgers University; \$370.00 in support of a petrologic study of the Lower Silurian quartzites and conglomerates of New Jersey.

Manuel N. Bass, Northwestern University; \$1,500 in support of a study of buried basement rocks of the central United States.

Applications for the grants-in-aid were screened by the AAPG Research Committee, R. Dana Russell, Chairman. The Association's Research Fund was increased materially through the efforts of G. M. Knebel during his term as President.

At the recent meeting of the American Chemical Society, push button control for speakers kept Chemical Literature Division participants on time and otherwise in line. A five-button control box was operated from the back of the room. Flashed to the speaker from a receiver on his desk were any or all of the following messages: slower, louder, five minutes, finish. The fifth button—a buzzer . . . you've had it.

NATIONAL ACADEMY OF SCIENCES

appoints *Educational Advisory Board*

Early this year, the National Academy of Sciences-National Research Council created an Educational Advisory Board to advise broadly on the opportunities and responsibilities of the Academy-Council in the field of education. Appointed to represent the Earth Science Division on this panel is Dr. Chalmer J. Roy, Chairman, Department of Geology, Iowa State College.

The very nature of the Academy-Research Council makes it entirely fitting that it should assume a maximum responsibility in the search for solutions to the present and future crises in scientific and professional education. Problems of immediate concern are: the increasingly serious shortage of scientific and professional personnel, and the problems created by "the rising tide" of college enrollments. Solutions to these problems will require the best, and combined, efforts of interested and informed individuals in science, engineering, industry, government, education, and the public at large.

Some Divisions of the Research Council and numerous scientific and professional societies have maintained active interest in educational problems. There has been, unfortunately, little organized or sustained effort to promote and maintain better educational policies in the Earth Sciences. In this regard, we are perhaps unique among the major fields of science and technology.

Among the objectives of the new board are the following, each of which should be the concern of the various professional societies of the Earth Sciences and of every individual earth scientist:

1. *"That every means be explored to attract more gifted students into professional careers, especially in science and engineering." This should be a challenge to every professional person.*

2. *"Promote common planning among, to cooperate with and otherwise to assist professional societies in activities directed toward the improvement of education." How are the Earth Sciences to be represented in such "common planning"?*

3. *"Join with other organizations and institutions (and individuals) in strengthening and maintaining the subject matter preparation of teachers at all levels of science education." Individuals and local scientific societies can be most effective in this regard by insisting on higher and*

Geophysics Scholarships Awarded

The student membership committee of the Society of Exploration Geophysicists has announced the awarding of two scholarships open annually to the son or daughter of an SEG member.

The four-year, \$3,000 Mayhew Scholarship in Geophysics has been awarded to Richard F. McReynolds, Brownfield, Texas who is enrolled at the Colorado School of Mines to study geophysics.

Ramil C. Wright, New Orleans, La. has been awarded the Griffin Scholarship in Geophysics, a four-year grant of \$750 per year given annually. He is enrolled at the Rice Institute in geophysics.

sustained standards in local school systems.

4. *"Anticipate future national requirements for scientific manpower and to relate these to all levels of science education." Professional societies and industry could combine to provide a realistic appraisal of the future of the Earth Sciences.*

5. *"Stimulate and encourage activity in all branches of engineering and the sciences to the end of making knowledge available in forms useful and logical for all levels of education." This would apply to any and all media of communication and at all levels from pre-school age to graduate students. Earth Scientists have a unique opportunity to make their subject available in useful and logical form because instructional materials are everywhere at hand.*

Every earth scientist should become thoroughly informed on the real educational policies and problems in the local community and appropriate institutions of higher education. How many are aware of the educational policies and financial needs of their own alma mater? How many, fifteen years out of college, know as many names and pedigrees of the present faculty members in their major department as they know of members of last year's football team?

The members of the new board and the divisions they represent are: *Engineering*, Maynard M. Boring, General Electric; *Physical Sciences*, George R. Harrison, American Institute of Physics; *Mathematics*, S. S. Cairns, University of Illinois; *Biology and Agriculture*, Howard M. Phillips, Emory University; *Earth Sciences*, Chalmer J. Roy, Iowa State College; *Chemistry*, J. C. Warner, Carnegie Institute of Technology; *Anthropology and Psychology*, Dael Wolfe, AAAS; *Medical Sciences*, W. Barry Wood, Johns Hopkins University.

Educational Television

Several educational TV films, featuring in part the earth sciences, are available to colleges, universities, public schools and other educational institutions through Education Television and Radio Center, 1610 Washtenaw Avenue, Ann Arbor, Michigan. Local geological societies could qualify to obtain these films.

The organization is non-profit and was established with a Ford Foundation grant. The films are available for a modest rental of \$30-\$100 per half-hour program, and may be used over commercial TV stations provided there is no commercial sponsor nor advertising. Firms may support use of the films through donations under certain conditions.

Following are three such film series available through the organization:

1.

Science in Sight—Through a combination of filmed trips, artifacts and exhibits in the studio, and invited guests, the child learns about sinkholes, fossils in rocks, soil saving, water conservation, how to make and keep an aquarium, how electricity is generated and transported, weather reporting, and about telescopes. This series features Robert F. Lemen, Principal, Wydown School, Clayton, Missouri. Mr. Martin Schneider produced and directed this series for KETC, St. Louis. Dr. John Whitney, Harris Teachers' College and City of St. Louis Public School System, acts as consultant for this series. (14 programs—15 minutes. Rights: ETV.)

2.

Science in Action I—This is a series of 13 programs produced by the California Academy of Science. Subjects range over the field of science covering up-to-the-minute developments in areas as diversified as rain-making and volcanoes, bridge building and anti life, detergents and plutonium. Dr. Earl S. Herald, Curator at the Aquatic Biology, Steinhart Aquarium, serves as program host. Although he is a highly qualified scientist himself, each week he brings in one or more guests who are the top scientists in the subject area. Among these are Dr. Glenn T. Seaborg, one of the leaders in the discovery of plutonium; Dr. Harold C. Urey who was awarded Nobel Prize for the discovery of heavy hydrogen; Dr. Howel Williams who is one of the world's authorities on volcanoes; and some "practical scientists" such as Fleet Admiral Chester W. Nimitz who was a submariner before he became the top-ranking officer in the United States Navy, and George Bamberger, one of the leading curve-ball pitchers of all time. Dr. Herald interviews his guests seeking the latest de-

velopments in the world of science and together they illustrate and demonstrate these developments. (13 programs—30 minutes. Rights: ETV.)

3.

The Great Plains Trilogy I & II—The fascinating story of the origin of the universe and the formation of the earth . . . the earth's changing face during thousands of millions of years . . . how we know the age of prehistoric fossils . . . the development of the first forms of life . . . how fossil bones are collected and prepared . . . the entertaining story of animals that lived on the Great Plains as far back as 350 million years ago, and up to the coming of early man during the Ice Age. Presented by Dr. C. Bertrand Schultz, professor of geology and director of the University of Nebraska State Museum. Guests throughout the series: Dr. Benjamin H. Burma, associate professor of geology and curator, invertebrate paleontology, University of Nebraska Museum; Newell Joyner, naturalist-guide at the Museum; Lloyd G. Tanner, assistant curator, vertebrate paleontology at the Museum; Thompson M. Stout, assistant professor of geology; Dr. Richard L. Threatt, assistant professor of geology; Dr. A. L. Lugin, professor of geology; and Henry Reider, preparator, University of Nebraska State Museum. (26 programs—30 minutes. Rights: ETV, ESP.)

National Science Foundation Aids Geoscientists

*NSF makes grant
to AGI*

The National Science Foundation made a grant of \$13,000 to the American Geological Institute in the last quarter of the 1955-56 fiscal year to aid in meeting general operating expenses.

The AGI has also applied to the NSF for a conditional grant of \$20,200 to supplement anticipated income in providing funds essential for the basic operations of the Institute, development of the professional news magazine, *GeoTimes*, and the preparation and printing of career literature, the directory of geology departments and the combined directory of geologists and geophysicists.

The Foundation made a similar grant to the American Institute of Biological Sciences in its formative years.

The National Science Foundation as yet has not ruled on the \$20,200, which the AGI Finance Committee proposes be made available only in amounts to match new funds to be raised by the Institute. It is anticipated that the geological profession can and will assume full responsibility for the basic financing of the Institute by 1957-58.

Atoms for Mankind's Progress

The increasing importance of civilian utilization of atomic energy is epitomized by the evolution of the Nuclear Congress: the 1955 Congress in Cleveland was put on by the Engineers Joint Council in collaboration with a score of engineering and scientific societies, and with the International Atomic Exposition as an added attraction. The 1957 Congress to be held in Philadelphia, March 10-16, 1957, is a cooperative venture organized as follows:

2ND NUCLEAR ENGINEERING AND SCIENCE CONFERENCE—Sponsored by a score of engineering and scientific societies under the leadership of EJC

5TH ATOMIC ENERGY IN INDUSTRY CONFERENCE—Sponsored by National Industrial Conference Board

5TH HOT LABORATORIES AND EQUIPMENT CONFERENCE—Sponsored by the Hot Laboratories Committee

INTERNATIONAL ATOMIC EXPOSITION—Sponsored by AIChE with the cooperation of ASCE, AIME, ASME, AIEE

The conference for engineers and scientists overlaps by one day the sessions of the industrial groups and the specialists in laboratories and equipment, thereby affording the opportunity for interchange of engineering, scientific, administrative, legal, and financial data and views. The consolidation of activities should result in a considerable saving of time and effort otherwise spent in attending separate meetings, and should justify a more comprehensive and extensive exposition than heretofore possible. The 1957 Nuclear Congress embraces civilian activities beyond engineering and science, and this evolution is consistent with the objective stated by EJC:

"It is recognized that nuclear engineering and science crosses most of the technological disciplines. The EJC Nuclear Engineering and Science Congresses have been designed to provide a common forum for all those actively engaged in the various fields of nuclear energy. The exchange of ideas, the discussions of mutual problems, and the stimulation of cooperative endeavor are the focal points of the Congress."

The slogan "For mankind's progress" has been adopted by the EJC for the 1957 meeting.

To keep the technical sessions within bounds, both in numbers and subjects, it will be necessary for the Program Com-

BASIC EDUCATION

A new national organization, the Council for Basic Education, has been incorporated in the District of Columbia. Created to deal with fundamental problems of education, this group will enlist the support and cooperation of educational, professional and citizens' organizations in seeking to provide more effective training for both teachers and students in basic subjects, especially English, mathematics, science, history and foreign languages. At present, its activities are being financed by a grant from one of the private foundations.

The avowed purpose of the Council is to promote and maintain such high academic standards that all children will not only have the opportunity of attending school, but will also have "the privilege of receiving there the soundest education that is afforded any place in the world."

Officers of the new organization are Dr. Arthur Bestor, University of Illinois, president; Judge Paxton Blair, former N. Y. Supreme Court justice, vice-president; Dr. H. A. Meyerhoff, Scientific Manpower Commission, treasurer; and Prof. Harold L. Clapp, Grinnell College, executive secretary, appointed for one year.

On the Educational Front

A recent letter from Professor Clyde T. Hardy, Utah State Agricultural College enclosed a letterhead of the Kaysville (Utah) Pebble Pup Society, which depicts a pebble pup by simple line drawing. This elementary school society wrote asking Prof. Hardy for a copy of his paper "Meteorites and How to Find Them," and indicated it was planning a field trip.

mittee to be highly selective in arranging papers into sessions on unified topics. An effort is being made to schedule no more than four concurrent sessions thereby limiting the four-day engineering and science conference to a total of 32 sessions.

The AGI program activities for the Nuclear Congress are headed by W. R. Thurston, Executive Secretary, Earth Science Division, NAS-NRC, 2101 Constitution Ave., N. W., Washington 25, D. C. Although the date is late, it may still be possible for interested authors to find an open spot on the program.



LETTERS

DEAR SIR:

Admittedly a petty gripe but on p. 12 of your August issue you state that the University of Mexico is the oldest college in the Western Hemisphere, 80 years older than Harvard (1636). The Mexicans always make this boast but it is a well-known fact that the University of San Marcos in Lima, Peru, was founded by decree of Carlos V in 1551, and that the University was first used in 1553, 3 years before the University of Mexico.

I enjoy your magazine immensely. I hope to continue receiving it at the above address.

A. A. MEYERHOFF,
Habana, Cuba.

DEAR EDITOR:

It seems to me that in the argument over the status of geological field work as research some essential points have been omitted. Field work, like laboratory work, is research only if it fulfills certain qualifications. If done for the purpose of discovering, developing, or refining techniques, field work may be research in method. If done for the purpose of discovering, elaborating on, or refining concepts, field work may be research in principle. Field work is not research if done only to trace further the limits of a certain formation, a certain species, or a certain ore body.

The engineer who takes a set of plans and builds a bridge is not doing research. The bacteriologist who runs routine analyses is not doing research. Neither is the geologist doing research who goes into the field each day and routinely takes his measurements and plots them on a map. All these activities lead to new knowledge, as may the calculation $536,106.11 + 205,113.54 = 741,219.65$. (There is a probability, however small, that this particular summation has never been done before.) But such new knowledge alone is not the goal of research—perhaps the objective is new fields of knowledge.

Most geological research requires a basis of field work but all field work is not research. Whether or not field work is research depends on the how and the why; I believe geologists will err if they do not take this into account.

Sincerely,

HENRY H. GRAY,
Indiana Geological Survey.

DEAR SIR:

As a long time associate of Herbert Hoover, Jr., I was indeed delighted to see our publication give Herb recognition in the field of diplomacy, where he is eminently qualified by training, experience, and temperament.

Very truly yours,

GLEN M. RUBY.

DEAR ED.:

On page 14 of your August issue there is a fine example of the uncalled-for apostrophe: you quote the title of a new book as *Forest and Range Policy, It's Development in the United States*. It's too bad to see GeoTimes contributing to the country's steady march toward universal illiteracy. Its editor should know better.

Watchfully yours,

PEG M'TITE.

DEAR SIRS:

We appreciate greatly your courtesy in sending us your Career Kit on geology and related sciences. It is through examination of such guidance materials that we hope to develop more effective procedures for encouraging qualified young people to consider careers in science and allied fields.

Sincerely yours,

RALPH E. KEIRSTEAD,
Consultant in Science,
Connecticut Department of Education.

Tech Students *continued from page 9*

tried their hand at bargaining while shopping for souvenirs and trinkets in the shops and markets. After dark, they mapped a cross-section of Mexican night life.

The trip home was not without incident. They were delayed by a landslide some 300 miles out of Mexico City and at one point a vulture tried to fly through the windshield of one of the cars.

The South Dakota Tech group was the largest student contingent to attend the Congress and certainly all of them agree with Tech President, Dr. F. L. Partlo, who commented that it was an opportunity of a lifetime for the group of geology students to attend this gathering of the world's foremost geologists.

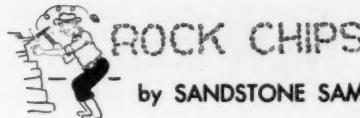


SATELLITE!, by Erik Bergaust & William Beller, 287 pp., Hanover House, Garden City, New York, \$3.95.

In recent years many popular books have appeared on rockets, satellites, and especially space flight. Some of these have been fiction, some have been technical or semi-technical narrations. The present volume recapitulates material in the latter category, using the current IGY earth satellite program of the Academy as the news-interest peg. The book is what is often called readable, and the general reader will find it entertaining. The chief limitations of the book are twofold. First, the substance is not always adequate. There are weaknesses in the discussions of atmospheric physics, for example, a well as questionable interpretations of the development of the IGT satellite effort. One tends to feel that the authors have been in haste to get a book out, curtailing the gestation period. Second, the book tries too hard to be all things to all men. It wants to appeal to the general public and so is laden with broad claims as to the future promise of satellites. It wants to attract career-minded youngsters and is emphatic about the thousands of jobs to open up. It wants to appeal to the large numbers of technicians and engineers in the military and so emphasizes missile aspects. Nonetheless, the book does present an interesting account of the subject, for the subject itself is exciting, and contains considerable information. Perhaps the authors might well in a few years profitably revise their first effort.

PETROLEUM PRODUCTION ENGINEERING, Oil Field Development, 4th Edit., 1956, by Lester C. Uren, 792 pp., McGraw-Hill Book Co., Inc., 330 E. 42nd St., New York 36, N. Y. \$12.00.

This new volume replaces the third edition published in 1946. Much of the material has been reorganized and many new data have been added, reflecting the advancements in the field of petroleum engineering over the past ten years. It is well suited as a text in petroleum engineering and as a reference book for those not thoroughly versed in engineering practices.



A Yale geologist named Livingstone, commenting on the 12-year old Californian who recently enrolled at Harvard to study nuclear physics, said "What's so unusual about that, most Harvard Ph.D.'s act like they are 12."

* * *

Dear Sam:

I am crushed—my golden opportunity to cash in on the big mineral give away ended in frustration. The king-size micro-specimen which reposed in the bottom of the box of my favorite cereal was labelled "Lepidolite from California"—but alas, it turned out to be pink tourmaline.

* * *

Overheard at the Congress: 'But, my dear fellow, you can't put reliance on a stratigraphic correlation that is not based on the fusulines.'

* * *

A sophomore geology student has defined permeability as the ability of a rock to pass water.

COAL MINING, by I. C. F. Statham, 564 pp., Philosophical Library, Inc., 15 E. 40th St., New York 16, N. Y. \$15.00.

A comprehensive review of the British coal industry and the status of its technology.

THE POTENTIALS ABOUT A POINT ELECTRODE AND APPARENT RESISTIVITY CURVES for a two-, three- and four-layer earth, by H. M. Mooney and W. W. Wetzel, 146 pp., plus supplement containing charts, University of Minnesota Press, 1956, Text \$4.50, Charts \$15.00, Complete \$18.00.

CONTRIBUTION TO THE GEOLOGY OF URANIUM AND THORIUM, by The U. S. G. S. and A.E.C. for the United Nations International Conference on Peaceful Uses of Atomic Energy, Geneva, Switzerland, 1955, compiled by L. R. Page, H. E. Stocking and H. B. Smith, USGS Prof. Paper 300, 739 pp., 1956, U. S. Gov't. Printing Office, Wash. 25, D. C., \$6.00.

NEW Ideas Products Services

GEO-TIMES will welcome press releases and notices of new ideas, products and services from companies and individuals for possible use in this section.

Gravimeter for Shipboard Operation. Experiments have been conducted by A. Graf of Lochham, Germany, to develop a gravimeter which will work from a surface ship. Dr. Graf has used a recording gravity meter with special electro-magnetic damping.

Surwac is the name of a pilot model of a "Surface Water Automatic Computer" being tested by the U. S. Geological Survey for processing stream flow record data. The electronic computer is capable of obtaining daily mean gage height and daily mean discharge values which are punched out on record tapes. Results may be transposed automatically from the tapes and the tapes may serve as a basis for further computations.

A new 100 Kv Electron Microscope is available with numerous unique operating features including a hinged objective lens for quick change or cleaning of pole inserts, magnetic compensator, objective diaphragm with multiple ap-



ertures and insert screens with binoculars for ultra-thin specimens. The upper magnification level is 200,000 diameters. For information write to North American Philips Co., Inc., 750 South Fulton St., Mount Vernon, N. Y.

Micropaleo laboratory facilities available for: 1. A study program selected by the applicant leading to publication in other suitable media, or by this laboratory. 2. A study program under the guidance of the director, leading to publication. 3. A training program designed to qualify trainee for work as an oil company micropaleontologist. The laboratory does not give academic credits, but aims to assist serious workers in becoming better fitted for oil company micropaleontological work. For details write: McLean Paleontological Laboratory, James D. McLean, Jr., P.O. Box 916, Alexandria, Virginia.

1957 AAPG Nominations

The AAPG Nominating Committee, ROY M. BARNES, Chairman, submitted the following slate of officers for 1957: For president, HOLLIS D. HEDBERG and GRAHAM B. MOODY; for vice-president, B. WARREN BEEBE and GROVER E. MURRAY; for secretary-treasurer, WILLIAM J. HILSWECK; and editor, SHERMAN A. WENGARD. Additional nominations may be submitted for any office by written petition, bearing 50 or more AAPG members' signatures, on or before November 15, 1956. The ballot is by mail and the newly elected officers will take office at the close of the annual meeting April 1-4, 1957.

More about our cover

G. C. Amstutz, who recently left Peru to become Associate Professor of Geology, Missouri School of Mines, Rolla, supplied the cover photograph for this issue of GEO TIMES.

Describing the photograph Professor Amstutz writes: "It shows orbicular weathering in granite near Huaras, Northern Peru (about 10 miles west of Huaras, along the road to Casma). The outcrop is half a square mile in area and shows over a thousand spheres of weathered granite. Some of them exhibit up to 30 "skins." Apparently this weathering is subsequent to a boxwork type of jointing. Under the microscope, the boundary between individual skins is marked only by an accumulation of limonite and by pronounced weathering of the feldspars and mafics. The occurrence of small pieces of clay (remnants) in the center of some of the spheres suggests the possibility that at least some of these spheroidally weathered portions of the granite batholith may have had orbicular structure."

Deep-Sea Corer. Columbia University's Lamont Geological Observatory has developed a new deep-sea corer for taking cores on the ocean bottom. The new instrument is 11.5 inches in diameter and releases a 135 pound weight which drives the core barrel into the ocean bottom. The new instrument gives a much larger relatively undisturbed sediment sample than the earlier 2 3/4 inch tool used by the Columbia scientists. A still larger core barrel, 3 feet in diameter and driven by a 1000 pound weight, is being designed.

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ONE INCH BOX	25.00	22.50	21.25	20.00

Min. charge \$1.00. AGI box numbers \$1.00 extra. No discounts. All classified advertisers will be billed, do not send advanced payments. Address all communications to American Geological Institute, 2101 Constitution Ave., Wash. 25, D. C.

POSITIONS WANTED

BOX 246. Economic Geologist, 36, M.S. degree, wishes to associate with domestic or international consultant, investment or exploration group or represent U. S. mineral interests in Europe. 9 years of domestic and foreign exploration and evaluation experience in metallic and non-metallic minerals. Working knowledge of Spanish, German, French. Aerial photo interpretation and commercial pilot.

BOX 247. Petroleum Geologist, 40, A.B., married, 12 years geological experience; mapping, subsurface, drilling supervision, evaluation, engineering and management. Presently employed as district geologist; desires similar position in western states or foreign.

BOX 248. Exploration Geologist, oil and mineral, surface and subsurface degrees: P.E. & M.P.E., Colorado Mines, wishes to associate with investment or exploration group, 20 years domestic and Western Hemisphere experience in oil exploitation, and mineral examination. Working knowledge Spanish and Portuguese. Aerial photo and weather modification experience (make or suppress rain).

BOX 249. Geologist, 25, Ph.D. Primary interests sedimentation, sedimentary fabric analysis, statistics. Some teaching and industrial experience. Desires research-teaching position in College or University.

GEOLOGICAL EMPLOYMENT desired. B.S. and M.S. from L.S.U. 75 hours in geology, 5 hours in P.E. Some background in micropaleontology. 1½ years of industrial experience. Mailing address: Ray Gremillion, 812 Richland Ave., Baton Rouge, La.

BOX 250. GEOPHYSICIST, M.S., wants West Coast or Rocky Mountain post. Offers eight years in research, ground-water, and base metal exploration. Assures confidential treatment of your inquiries.

VACANCIES

BOX 71. Seismologist. Some graduate school training required. Needed to analyze data from seismological stations and conduct research. Salary open.

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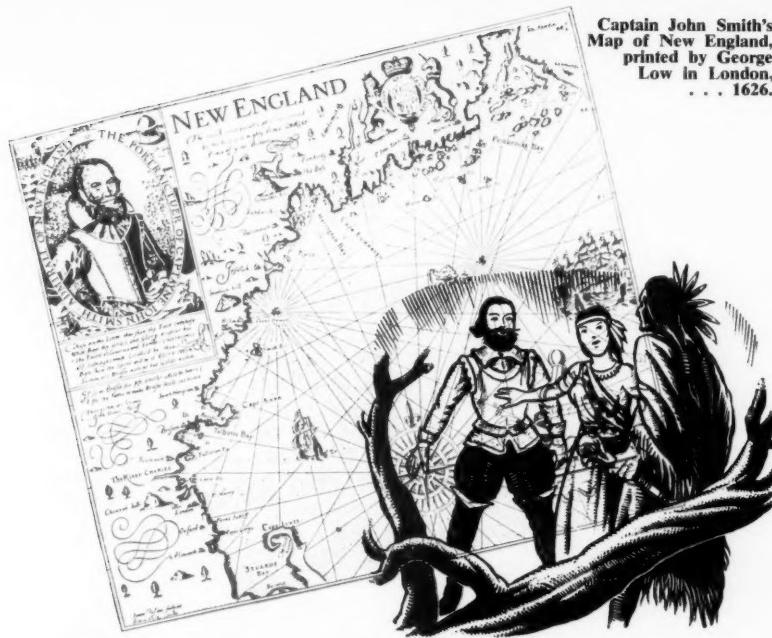
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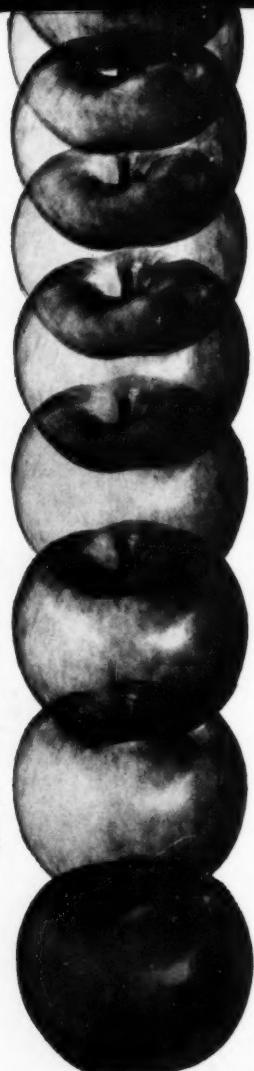
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